Space Weather Forecast

Issued on Monday 7 October 2024 at 13:30 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/Minor Geomagnetic Storms likely day 1 and 2 (07-08 Oct) given CME influence. Isolated R1/R2 (Minor to Moderate) Radio blackouts expected on all days.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is Moderate.

There are ten sunspot groups on the Earth-facing disc, two of which have been recently numbered. The southwest quadrant remains heavily populated with large, complex regions. A new region emerging on the east limb, analyse remains difficult due to foreshortening and classification subject to change.

There is a large 'filament' (arc of plasma) in the southwest of the Sun - given its location this is something to monitor for any possible Coronal Mass Ejection (CME) should it destabilise.

No Earth-directed CMEs were observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind varied between Slightly Elevated and Elevated speeds for much of the period following recent CME arrival. The Interplanetary Magnetic Field (IMF) fluctuated around the Moderate threshold, but was enhanced to Moderate to Strong levels following passage of the CME front. The important north-south component was initially Weak, but strengthened to become Moderate to briefly Strong after the CME arrival, ranging between+17/-13nT, with periods moderately negative.

The net result of the above solar wind measures was generally Quiet to Active (Kp2-2) conditions, but with G1 Minor Geomagnetic storm (Kp5) intervals.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to remain generally Moderate, with a slight chance of increasing to High levels given a risk for isolated Strong flares, mainly from the two large regions in the southwest disc.

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Solar Wind / Geomagnetic Activity: There is a chance of a glancing impact late on Day 1 (07 Oct) or early Day 2 (08 Oct) from a CME that left the southwest quadrant of the Sun on 04 Oct.

Geomagnetic activity is likely to be mostly Unsettled to Active, but with isolated G1/Minor Storm intervals likely through the remainder of Day 1 (07 Oct) and into Day 2 (08 Oct) given continued CME influence and potential coronal hole enhancement. Becoming mostly Quiet to Unsettled by Days 3 and 4 (09-10 Oct).

Energetic Particles / Solar Radiation: There is a daily chance of exceeding the S1/Minor Storm threshold should further significant flares occur.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	Yes	70	60	5	1
Strong	**G3**	No	5	1	1	1
Severe	**G4**	No	1	1	1	1
Extreme	**G5**	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 (M Class)**	Yes	80	80	70	60
Very Active	**R3-R5 (X Class)**	No	20	20	15	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	30	30	20	15
Very Active	**≥ S3 ***	No	5	5	5	1

* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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